

REMARKS

Reconsideration and allowance of the subject application is solicited.

We first thank the Examiner and the Primary Examiner for courtesies extended to applicant's representative during the telephone interview on July 27, 2010. The substance of the interview is summarized here.

Claims 12, 13 and 15 are amended above. Claim 16 is canceled without prejudice or disclaimer. Claim 12 is amended to read: "A method of ~~protecting~~ reducing or delaying damage to submerged structures ~~from damage~~" This is supported by the specification at page 13, first full paragraph, and the results in the Examples. Claim 12 is also amended to read: "applying to the outside of the structure a biocide-free antifouling agent" This clarifies where the agent is applied, and is supported by the description as a whole, for instance, at page 6, 6th full paragraph, and the Examples. Claim 12 is further amended to read: "antifouling agent comprising ~~mineral~~ fine basalt fibers or filaments, or comprising a combination of fine basalt fibers or filaments and E-glass fibers, wherein the fine basalt fibers or filaments or E-glass fibers have with a SiO₂ rate of more than 50% by weight," The subject matter of dependent claim 16, reciting the preferred embodiment for mineral fibers/filaments, is incorporated. The amendatory language clarifies the original intent of the application, that the antifouling agent can comprise the basalt fibers/filaments alone, or the combination of fine basalt fibers/filaments and E-glass fibers. The specification also states that E-glass fibers are useful component. This is supported by the Examples, which show that basalt filbers/filaments alone are useful for antifouling agents. Claim 12 is further amended to read: " wherein the antifouling agent is applied in the form of a textile fabric selected from the group consisting of interlaid scrim, woven fabric, knitted fabrics or braiding, a fabric designed by the multiaxial technique, and a fleece," The Markush group language is clarified, and the language is generally streamlined for readability. Lastly, claim 12 is amended to read: " wherein the exterior surface of the textile fabric to be in contact with the seawater or industrial water ~~the antifouling agent~~ is formed predominantly by exposed freely mobile fine basalt fibers or filaments ~~and the fabric is designed as interlaid scrim, woven fabric, knitted fabrics or braiding, a fabric designed by~~

~~the multi-axial technique or a fleece.~~” This is supported by the specification at the Examples (especially Examples 1, 2 and 3), the discussion on page 10, 3rd full paragraph, page 11, 1st and 5th paragraphs, and page 12, 2nd, 3rd, 6th and 7th paragraphs.

Claims 13 and 15 are amended to correct antecedent basis from claim 12.

No new matter is introduced by any of these amendments, and entry and full consideration on the merits are respectfully requested.

In the Office Action, Claims 12-13, 15-21 and 25 were rejected under 35 U.S.C. §103(a) as obvious over Seeman (U.S. Patent 4,483,267), in view of Lane (U.S. Patent 4,756,265), Swink (Continuous Filament Basalt), and Yan et al. (CN 1421351, as cited in the International Search Report). Claims 14, 22-24 and 26 were rejected under 35 U.S.C. §103(a) as obvious over Seeman (U.S. Patent 4,483,267), in view of Lane (U.S. Patent 4,756,265), Swink (Continuous Filament Basalt), and Yan et al. (CN 1421351, as cited in the International Search Report), and further in view of Dunn (US published application 2005/0070182).

As discussed during the interview, the claims are now limited to the basal fibers/filaments alone or in combination with E-glass fibers. None of the cited art describe a method for reducing/delaying damage to submerged structures by applying basal fibers/filaments (or even E-glass fibers) as an anti-fouling composition. The primary reference Seemann (USP 4,483,267) is acknowledged by the Examiner as not suggesting that mineral fibers/filaments or E-glass fibers are useful as anti-fouling agents.

We further note that Seemann teaches that an outer skin is applied to the fiber-glass skin (column 4, lines 4-9). Hence, the E-glass fiber would not be the outer-most layer in contact with the seawater. Proposed claim 12 requires that the agent is applied to the outside of the structure to be submerged.

USP 4,756,265 describes special lifting structures and a special thrust collar for the propeller of a speed boat. For purposes of relevance to our claims, this reference only discloses that the hull might consist of E-glass fibers (column 5, lines 35-38). The fibers are used for giving the hull stability and strength. Our claims require that the E-glass

fibers be used together with basalt fibers/filaments, applied as a textile fabric in a method to reduce/delay damage from biofouling.

The “Continuous Filament Basalt” symposium reference describes the manufacture of fibers from basalt. It does not suggest a method to reduce/delay damage from biofouling by applying basalt fibers/filaments as a textile fabric.

CN 1421351 describes the method of making the hull of a boat with basalt fiber reinforced material. The basalt material is used for its mechanical performance, superior over common glass fiber – e.g., acid and alkali resistance, heat stability, tensile strength, etc. This contrasts with our claims which require that the surface of the textile fabric be formed predominantly by the fine basalt fibers/filaments, for the purpose of increasing the anti-fouling effect. Again, no method for reducing/delaying biofouling is suggested.

US 2005/0070182 describes the use of tows to form channels in which to insert a resin that forms a composite fabric. The composite can include glass-fibers. This resin and composite do not describe basalt material, and are not suggested as useful in a method for reducing/delaying biofouling.

During the telephone interview, the Examiner suggested that the claimed invention could be distinguished from the prior art by affirmatively stating in claim 12 that the basalt fibers/filaments on the exterior side of the textile fabric are exposed (i.e., not impregnated or saturated with resin or composite, etc.) and freely mobile. This contrasts from the prior art – especially CN 142351 – which teach only that the basalt fibers are present in a composite material or a matrix resin (e.g., as part of a ship’s hull during manufacture). As described in our application, it is important to the method of our invention that the fibers be exposed to the seawater, and freely mobile and flexible in the water – these free fibers (that is, free from being stuck to the surface of the submerged structure) are an inhospitable substrate to underwater pests.

In the Examples, Test Plate 1 tested a basalt woven fabric almost completely saturated with epoxy adhesive, where “freely mobile fibres appeared only very few and far between”. Test Plate 2 tested basalt woven fabric where epoxy had been applied to the side that would not be the exterior exposed to the water – however, some epoxy

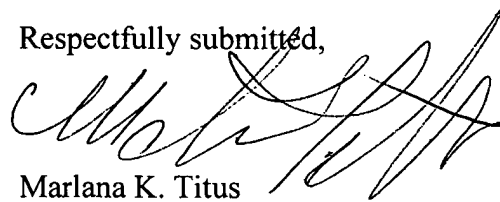
seeped through so that the "individual fibres were only partially stuck". The test pipe in Example 3 was attached with adhesive strips, so that the fibers were unable to be glued together and were exposed and freely mobile.

In the results, Test Plate 1 was strongly fouled, because "the surfaced was formed for the most part not by the basalt fabric, but by the penetrated epoxy adhesive" (page 10, 3rd full paragraph). In Test Plate 2, "the surface was formed predominantly by free basalt fibres" and the fouling was clearly delayed. On the test pipe, with "a mobile fibre substrate" the fouling was minimal.

This unique feature of our method distinguishes it from anything taught or suggested by the prior art. As discussed during the telephone interview, we have amended claim 12 to specify that the exterior surface of the textile fabric to be in contact with the seawater or industrial water is formed predominantly by exposed freely mobile fine basalt fibers or filaments. Withdrawal of these rejections is believed to be in order.

In summary, all of the Examiner's outstanding rejections and objections have been addressed, and the application is believed to be in allowable form. Notice to that effect is earnestly solicited. If the Examiner has any questions or would like to make suggestions as to claim language, she is encouraged to contact Marlana K. Titus at (301) 977-7227.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Marlana K. Titus', written over a horizontal line.

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